

CLAIMS

1. A temperature control apparatus (100-400), comprising:
a fan (10), including:

5 a field winding (F3);
a speed controller (12) for providing a speed control signal to said
field winding (F3) responsive to a first control signal to control a rotating speed
of said fan (10);

10 first and second inputs (1, 2) for enabling operating power to be
provided to said field winding (F3) and said speed controller (12), at least
one of said first and second inputs (1, 2) being operatively coupled to a first
voltage source; and

15 a third input (3) for providing said first control signal to said speed
controller (12), said third input (3) being operatively coupled to a second
voltage source;

temperature measuring means (30) for measuring a temperature and
providing a temperature indicating signal indicating said measured temperature;

processing means (40) for providing a second control signal responsive to
said temperature indicating signal; and

20 control means (60) for providing said first control signal to said third input
(3) of said fan (10) responsive to said second control signal.

2. The temperature control apparatus (100-400) of claim 1, wherein said control means (60) includes:

pulse generating means (64) for generating pulses responsive to said
5 second control signal; and

first switching means (Q1) for switching on and off responsive to said pulses to provide an output signal corresponding to said first control signal via a first conducting terminal.

10 3. The temperature control apparatus (100-400) of claim 2, wherein said control means (60) further comprises a first resistor (R1) having a first terminal operatively coupled to said first conducting terminal of said first switching means (Q1) and a second terminal operatively coupled to said third input (3) of said fan (10).

15 4. The temperature control apparatus (100-400) of claim 3, wherein said first switching means (Q1) further comprises:

a second conducting terminal operatively coupled to said pulse generating means (64) for receiving said pulses; and

20 a third conducting terminal operatively coupled to ground.

5. The temperature control apparatus (200-400) of claim 3, wherein said control means (60) further comprises a second resistor (R2) having a first terminal operatively coupled to ground and a second terminal operatively coupled
25 to said second terminal of said first resistor (R1).

6. The temperature control apparatus (300-400) of claim 5, wherein said control means (60) further comprises a capacitor (C1) having a first terminal operatively coupled to ground and a second terminal operatively coupled to said second terminal of said second resistor (R2).

7. The temperature control apparatus (400) of claim 2, further comprising second switching means (Q2) having a first conducting terminal operatively coupled to said second input (2) of said fan (10) and a second conducting terminal operatively coupled to said processing means (40) for receiving a third control signal to turn said fan (10) on and off.

8. A method for controlling temperature, comprising steps of:
providing a fan having a field winding, a speed controller for providing a speed control signal to said field winding responsive to a first control signal to control a rotating speed of said fan, first and second inputs for enabling operating power to be provided to said field winding and said speed controller, and a third input for providing said first control signal to said speed controller, at least one of said first and second inputs being operatively coupled to a first voltage source, and said third input being operatively coupled to a second voltage source;
measuring a temperature and providing a temperature indicating signal indicating said measured temperature;
providing a second control signal responsive to said temperature indicating signal; and
providing said first control signal to said third input of said fan responsive to said second control signal.

9. The method of claim 8, further comprising the steps of:
generating pulses responsive to said second control signal; and
providing said first control signal to said third input of said fan responsive
5 to said pulses.

10. The method of claim 8, further comprising the step of providing a
third control signal to turn said fan on and off.

10 11. The method of claim 10, wherein said fan is turned on if said
measured temperature exceeds a threshold for a predetermined number of
consecutive readings.

12. The method of claim 10, wherein said fan is turned off if said
15 rotating speed of said fan is at a minimum speed, and said measured
temperature is less than a threshold by a predetermined limit.

13. The method of claim 8, wherein said rotating speed of said fan is
increased if said measured temperature exceeds a threshold for a predetermined
20 number of consecutive readings.

14. The method of claim 8, wherein said rotating speed of said fan is
decreased if said measured temperature decreases for a predetermined number
of consecutive readings.

15. A device including a temperature control apparatus (100-400), said temperature control apparatus (100-400) comprising:

a fan (10), including:

5 a field winding (F3);
a speed controller (12) for providing a speed control signal to said field winding (F3) responsive to a first control signal to control a rotating speed of said fan (10);

10 first and second inputs (1, 2) for enabling operating power to be provided to said field winding (F3) and said speed controller (12), at least one of said first and second inputs (1, 2) being operatively coupled to a first voltage source; and

15 a third input (3) for providing said first control signal to said speed controller (12), said third input (3) being operatively coupled to a second voltage source;

a temperature measuring circuit (30) operative to measure a temperature and provide a temperature indicating signal indicating said measured temperature;

20 a processor (40) operative to provide a second control signal responsive to said temperature indicating signal; and

control circuitry (60) operative to provide said first control signal to said third input (3) of said fan (10) responsive to said second control signal.

16. The device of claim 15, wherein said control circuitry (60) includes:

25 a pulse generator (64) operative to generate pulses responsive to said second control signal; and

a first switch (Q1) operative to switch on and off responsive to said pulses to provide an output signal corresponding to said first control signal via a first conducting terminal.

17. The device of claim 16, wherein said control circuitry (60) further comprises a first resistor (R1) having a first terminal operatively coupled to said first conducting terminal of said first switch (Q1) and a second terminal operatively coupled to said third input (3) of said fan (10).

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18. The device of claim 17, wherein said first switch (Q1) further comprises:

a second conducting terminal operatively coupled to said pulse generator (64) for receiving said pulses; and

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a third conducting terminal operatively coupled to ground.

19. The device of claim 17, wherein said control circuitry (60) further comprises a second resistor (R2) having a first terminal operatively coupled to ground and a second terminal operatively coupled to said second terminal of said first resistor (R1).

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20. The device of claim 19, wherein said control circuitry (60) further comprises a capacitor (C1) having a first terminal operatively coupled to ground and a second terminal operatively coupled to said second terminal of said second resistor (R2).

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21. The device of claim 16, further comprising a second switch (Q2) having a first conducting terminal operatively coupled to said second input (2) of said fan (10) and a second conducting terminal operatively coupled to said processor (40) for receiving a third control signal to turn said fan (10) on and off.

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